SECTION 02623

POLYVINYL CHLORIDE (PVC) WATER MAIN PIPE

PART 1 GENERAL

1.1 SCOPE OF WORK

A. Furnish all labor, materials, equipment, and incidentals required, and install polyvinyl chloride (PVC) waterline, fittings, service connections and appurtenances as shown on the Drawings and as specified herein.

B. All water mains less than or equal to 12 inches in diameter shall be constructed of PVC, unless otherwise approved by Lee County Utilities.

1.2 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

A. This standard references the documents listed below. They form a part of this standard to the extent specified herein. In any case of conflict, the requirements of this standard shall prevail.

1. ASTM D1598 - Standard Test Method for Time-to-Failure of Plastic Pipe Under Constant Internal Pressure.

2. ASTM D1599 - Test Method for Short-Time Hydraulic Failure Pressure of Plastic Pipe, Tubing, and Fittings.

3. ASTM D1784 - Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.

4. ASTM D2122 - Standard Method of Determining dimensions of Thermoplastic Pipe and Fittings.

5. ASTM D2152 - Standard Test Method for Degree of Fusion of Extruded Poly (Vinyl Chloride) (PVC) Pipe and Molded Fittings by Acetone Immersion.

6. ASTM D2241 - Standard Specification for Poly (Vinyl Chloride) (PVC) Pressure Rated Pipe (SDR Series).

7. ASTM D2412 - Standard Test Method for Determination of External Loading characteristics of Plastic Pipe by Parallel-Plate Loading.

8. ASTM D2774 - Recommended Practice for underground Installation of Thermoplastic Pressure Piping.

9. ASTM D2837 - Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials.

10. ASTM D3139 - Specifications for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.

11. ASTM F477 - Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

12. AWWA M23 - PVC Pipe - Design and Installation.

13. NSF 14 - Plastics Piping System Components and Related Materials.

14. PPI TR3 - Policies and Procedures for Developing Recommended Hydrostatic Design Stresses for Thermoplastic Pipe Materials.

1.3 SUBMITTAL

A. Submit to the Engineer within fourteen days after receipt of Notice-to-Proceed a list of materials to be furnished, the names of the suppliers and the date of delivery of materials to the site.

B. Submit for approval, as provided in the Supplement to the General Conditions, complete, detailed shop drawings of all PVC pipe and fittings.

C. Submit and shall comply with pipe manufacturer's recommendations for handling, storing, and installing pipe and fittings.

PART 2 PRODUCTS

2.1 WATER MAIN

A. Polyvinyl Chloride (PVC) Pipe

1. All 4-inch through 12-inch diameter PVC pipe shall be rated per AWWA, C900, DR18, Class 150. Water mains larger than 12 inches shall be constructed of Ductile Iron Pipe.

2. PVC pipe less than 4-inches in diameter shall be Schedule 80 with a pressure rating of 200 psi solvent welded, including blow-off assemblies. PVC pipe will be acceptable for pipe diameters of 12 inches or less.

3. The potable water mains shall be blue in color.

4. All pipe shall be manufactured in the United States.

B. Steel Encasement Pipe: Conform to ASTM Designation A252, Grade 2. Joints shall be welded completely around the pipe by a certified welder. Pipe shall meet all AASHTO standards and Florida DOT requirements.

C. Fittings:

1. PVC Pipe: Fittings shall be ductile iron mechanical joint, with a working pressure of 250 psi and conforming to AWWA Specifications C110 or C153. For pipe 8 inches and smaller, fittings shall be C900 PVC rated fittings.

2. PVC fittings for 2-inch and smaller diameter pipe shall be threaded or glued and shall be Schedule 80 and conform to the requirements of ASTM D-2464. Threaded joints shall be used only with Schedule 80 pipe or stronger. At threaded joints between PVC and metal pipes, the metal shall contain a threaded socket and the PVC threaded spigot end. A metal spigot shall not, under any circumstances be screwed into a PVC socket.

~~2.~~PVC fittings 4 inches and larger in diameter shall meet the requirements of applicable AWWA C900 and C905 specifications. Fittings shall be manufactured entirely of PVC meeting ASTM D1784, shall be formed by a thermal-form process and be of one-piece construction, able to withstand 755 psi quick burst pressure-tested in accordance with ASTM D1599 and withstand 500 psi for a minimum of 1,000 hours tested in accordance with ASTM D1598. Bells shall be gasketed push on type conforming to ASTM D3139 with gaskets conforming to ASTM F477. Fittings shall be as manufactured by the Harrington Corporation, or approved equal. Cement lined ~~D~~ductile iron fittings with mechanical or push on joints conforming to AWWA C153 or C110 may be approved as alternative when PVC pressure fittings of the required sizes are not available. ~~If ductile iron fitting is used, the fitting shall be lined with Protecto 401 applied in strict accordance with the manufacturers specifications to a dry film thickness of 40 mils. Protecto 401 is an amine cured novalac epoxy containing at least 20% by volume of ceramic quartz pigment~~~~PVC fittings for 2 inch and smaller diameter pipe shall be threaded or glued and shall be Schedule 80 and conform to the requirements of ASTM D-2464. Threaded joints shall be used only with Schedule 80 pipe or stronger. At threaded joints between PVC and metal pipes, the metal shall contain a threaded socket and the PVC threaded spigot end. A metal spigot shall not, under any circumstances be screwed into a PVC socket. PVC fittings 8 inches, and less shall be a fitting manufactured entirely from PVC, shall be formed by a thermal-form process, and shall be of one piece construction. These fittings shall not use fiberglass over wraps and shall be compatible with joint restraining system. For PVC fittings larger than 8 inches, fittings made of one piece construction formed by a thermal form process shall be used where commercially available.~~

Tapping Sleeves: Sleeve shall be stainless steel, mechanical joint type, with working pressure rating of 250 PSI, and conform to AWWA Standard C110.

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~~4.~~3. All fittings shall be manufactured in the United States.

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D. Joint Restraining Devices: Restraining joints shall be placed at all bends, tees, plugs, reducers, and other fittings to provide lateral support, and shall conform to the details shown on the drawings in Section 9 of the Lee County Utilities Operations Manual. Concrete thrust blocks may be utilized as additional restraint if approved by Lee County Utilities.

1. Joint restraint devices for C-900, C905 PVC pipe used with ductile iron mechanical joint fittings shall be EBAA Iron Sales, Inc., Series 2000 PV, Uni-Flange 1300, Star Pipe Product, L.P., or approved equal.

2. Bell joint restraint devices for PVC push joint pipe shall be EBAA Iron Inc., Series 1600 for C-900 PVC pipe, Series 2800 for bell restraint on C-905 PVC pipe or Uni-Flange Series 1300, 1360 or 1390 or ROMAC Series 600, Star Pipe Products L.P., or approved equal.

3. C-900 or C-905 PVC fittings shall be restrained with EBAA Iron Inc., Series 2500 bell restraint for PVC fittings, Star Pipe Products, L.P., or an approved equal.

4. Bolts and nuts shall be Ductile Iron, T-Head type with hexagonal nuts. Bolts and nuts shall be machined through and nuts shall be tapped at right angles to a smooth bearing surface.

E. Joint Design: PVC pipe 4 inches in diameter or larger shall have provisions for expansion and contraction provided in the joints. All joints shall be designed for push-on make-up connections. Push-on joint may be a coupling manufactured as an integral part of the pipe barrel consisting of a thickened section with an expanded bell with a groove to retain a rubber sealing ring of uniform cross section, similar and equal to John's Mannville ring-type and Ethyl Bell Ring or may be made with a separate twin gasketed coupling similar and equal to Certainteed Fluid-Type.

~~1.2~~2.2 IDENTIFICATION

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A. Pipe shall bear identification markings that will remain legible after normal handling, storage, and installation. Markings shall be applied in a manner that will not weaken or damage the pipe. Marking shall be applied at intervals of not more than 5 feet on the pipe. Marking on the pipe shall include the following:

1. Nominal size and OD base.

2. PVC

3. Dimension ration

4. AWWA pressure rating.

5. AWWA designation.

6. Manufacturer's name and trademark.

7. Manufacturer's production code, including day, month, year, shift, plant, and extruder of manufacturer.

8. All PVC water pipe shall be color-coded blue.

PART 3 EXECUTION

3.1 WATER MAIN INSTALLATION

A. Polyvinyl Chloride (PVC) water pipe shall be installed in accordance with the manufacturer's recommendation, as shown on the drawings, and as specified herein.

B. The Contractor shall use care in handling, storage, and installation of pipe and fittings. Storage of pipe on the job site shall be done in accordance with the pipe manufacturer's recommendation. Under no circumstances shall pipe or fittings be dropped into the trench.

C. Pipe shall be laid to lines and grade shown on the drawings with bedding and backfill as shown on the drawings. Blocking under the pipe will not be permitted.

D. When laying is not in progress, or the potential exists for dirt or debris to enter the pipe, the open ends of the pipe shall be closed with plug or by other approved means.

~~1.2~~3.2 SERVICE CONNECTIONS

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A. All potable service taps shall be located in open/green areas unless specifically approved by Lee County Utilities. Any service taps that are approved within a paved area, a 2-inch cast iron body gate valve shall be used in lieu of a corporation stop.

B. Service connections shall be installed at the locations and in the manner shown on the Drawings.

C. Service clamps for PVC mains shall be full-circle bearing types as shown on the details in Section 9 of the Lee County Utilities Operations Manual.

D. Corporation stops and curb stops shall be fitted with a compression connection outlet with split-lock devices for polyethylene or copper pipe.

E. On curbed streets the exact location for each installed service shall be marked by etching or cutting a "W" in the concrete curb; where no curb exists or is planned, locations shall be adequately marked by a method approved by Lee County Utilities.

F. Service connection shall not be installed on pipelines 16 inches and larger unless extenuating conditions exist and said connection is approved by Lee County Utilities.

G. When practical, in new residential, commercial, or/and industrial subdivisions, the corporation stop shall be located at the intersecting property line or in the center of the lot.

1. Copper Pipe Copper pipe for 3/4-inch to 1-inch service line installations shall be American manufactured, Type K, and conform to the requirements of ASTM designation B88. Brass compression couplings with screw-clamp fittings shall be used with copper pipe.

2. Polytubing Polyethylene Tubing will be acceptable in sizes from 1-1/2 inches to 2 inches in diameter. Tubing for service lines shall be of a type approved by the National Sanitation Foundation for use in transmitting fluids for human consumption. The tubing shall be designed for a minimum burst pressure of 630 psi for water at 23ºC, and shall be manufactured in accordance with the requirements of ASTM D2737 and shall be blue in color.

~~1.3~~3.3 CLEANING

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A. At the conclusion of the work, the Contractor shall thoroughly clean all of the new pipe lines by flushing with water and pigged to remove all dirt, stones, pieces of wood, or other material which may have entered during the construction period. Debris cleaned from the lines shall be removed from the job site. If, after this cleaning, any obstructions remain, they shall be removed at the Contractor's expense.

3.4 TESTING AND DISINFECTION

A. Test completed water pipeline in accordance with Section 02676. Disinfect completed water pipeline in accordance with Section 02675.

END OF SECTION